

## Concise Communications

### Increase in Hand-Alcohol Consumption Among Medical Staff in a General Hospital as a Result of Introducing a Training Program and a Visualization Test

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#### ABSTRACT

To assess the impact of training programs, including a visualization test for hand disinfection, we monitored the hand-alcohol consumption of medical staff. The consumption increased steadily from 5.7 L of hand alcohol per capita per year in 1990 to 9.1 L in 1998. There was no significant increase in skin problems (*Infect Control Hosp Epidemiol* 2001;22:41-42).

Disinfection of hands by using medical alcohol or disinfectant soap is a well-established method of preventing nosocomial infections.<sup>1</sup> However, the thoroughness with which staff engage in this activity varies, and in many hospitals it remains a serious problem that could be avoided.<sup>2,5</sup> Pittet showed that, so far, no effort to improve compliance with hand hygiene has fully succeeded.<sup>6</sup> The aim of this study was to examine the effect on the medical staff of a training program supported by a visualizing test for hand disinfection.<sup>7</sup> Buchrieser et al showed in their study, which was based on our test, that 30% to 40% of the persons tested did not cover their fingertips and the areas between their fingers with fluorescent alcohol sufficiently.<sup>8</sup> Although the quantity of hand alcohol used is not necessarily linked to the degree of hand disinfection, it was taken as a parameter to indicate the intensity or frequency of hand alcohol use.

#### METHODS

This intervention study was carried out in a 260-bed teaching hospital with general surgery, gynecology and obstetrics, internal medicine, a dialysis ward, and an intensive care unit with 8 beds. The general hospital in Schaffhausen, Switzerland, recently developed a simple way to test the degree of hand disinfection, which was introduced in 1991 in training programs<sup>8</sup>; 90% of the nursing staff were taught hand hygiene intensively. Since 1994, the test has been used routinely in a 2-hour introduction about hospital hygiene that is taught to new medical staff (physicians, nurses, and physiotherapists). Since 1996, kitchen personnel also have been trained in hand disinfection. On all wards, dispensers with hand alcohol are available. Furthermore, staff are free to carry small bottles in their pockets. The visualization test involves covering the hands with fluorescent alcohol to show the covered and uncovered skin areas using a UV lamp. Areas of the hands

that are sufficiently covered glow yellow, while noncovered skin is purple. The test must be performed in a darkened room or with a special box. Hand disinfection is defined as rubbing the hands with an alcoholic solution (ethanol 85%) containing propylene glycol as a cosmetic additive. The effect of this training program was measured by hand-alcohol consumption rates of medical staff (physicians, nursing staff, physiotherapists, laboratory technicians) per capita per year from 1990 to 1998. A questionnaire was used to monitor dermatologic affections, such as skin irritation. In 1992 and 1997, the same questionnaire was used, in which skin irritation was defined as "redness," "dry skin," and "itching." When severe skin problems were reported, they were examined by a dermatologist.

For differences in skin irritation, a *P* value was calculated by chi-square test or Fisher's Exact Test. The level of significance was *P* < .05.

#### RESULTS

There was a marked and steady increase in use of hand alcohol in 1991 and 1992, immediately after the introduction of the visualization test. Hand-alcohol consumption increased from 5.7 L per capita per year in 1990 to 9.7 L in 1998 (Figure). Of 200 nurses, 71.5% answered the questionnaire about skin problems in 1992, and 80% of 150 nurses did so in 1997. Skin irritation (redness, dry skin, itching) remained stable. In 1992, 24% and, in 1997, 21% of the medical staff reported that they had never experienced problems with their skin (Table). Most of the skin irritation problems could be controlled with more frequent skin care.

#### DISCUSSION

Although the increase in hand-alcohol consumption was associated with the teaching program, there are several limitations to our results.

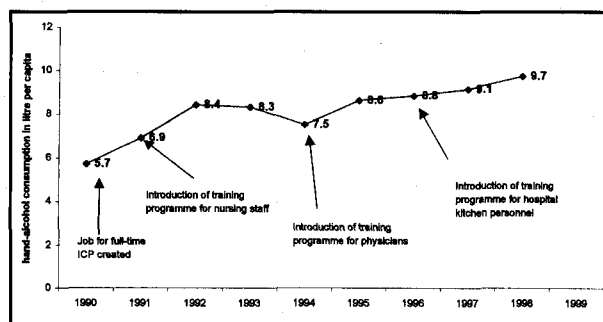


FIGURE. Hand-alcohol consumption rates per capita (medical staff) per year from 1990 to 1998, General Hospital Schaffhausen. Abbreviation: ICP, infection control practitioner.

TABLE

FREQUENCY OF SKIN IRRITATION SYMPTOMS, 1992 VERSUS 1997

Symptoms	1992	1997	P
	No. (%)	No. (%)	
Number	143	120	
Never had symptoms of irritation	34 (24)	25 (21)	.56
Dry skin	54 (38)	45 (38)	.96
Redness	21 (15)	11 (9)	.17
Itching	28 (19)	34 (28)	.09
Severe problems (allergy, neurodermatitis)	6 (4)	5 (4)	.90

Several factors could have caused the increase of hand-alcohol use. Promoting hand disinfection by using an alcohol solution rather than washing hands with water may have increased alcohol consumption. The case mix could have changed over the years, leading to more frequent use. Furthermore, it is possible that individual hand disinfection did not really improve. Compliance was not monitored, because it is difficult to investigate personnel without influencing behavior. Other activities of the infection control practitioner, for example, ward rounds and surveillance programs, also may have had an impact on staff disinfecting their hands.

That nursing staff decreased from 277 in 1990 to 204 in 1998 underlines the hypothesis that more alcohol for hand disinfection was used. We are convinced that introducing the disinfection method and the visualization test when employees start in their workplace is important. Indeed, because many people who were introduced to the test years before still were impressed by its obvious results.

Because hand-alcohol consumption alone says nothing about how well the hands were disinfected and whether this was done in appropriate situations, more studies should be done to show whether this increase improves individual hand disinfection. Furthermore, it will be important for future studies to measure the direct impact of an improved hand-disinfection technique on nosocomial infection rates.

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## ***Clostridium difficile*-Associated Diarrhea in a VA Medical Center: Clustering of Cases, Association With Antibiotic Usage, and Impact on HIV-Infected Patients**

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## ABSTRACT

A case-control study of patients with stools assayed for *Clostridium difficile* toxin over a 24-month period at a Veterans Affairs hospital found that the majority of cases (70.6%) occurred in temporal clusters. Clustering was particularly evident on a designated human immunodeficiency virus (HIV) unit. Thirty-four (75.5%) of 45 HIV-infected patients with *C. difficile*-associated diarrhea (CDAD) died during their hospitalization. Third-generation cephalosporins were the antibiotics most strongly associated with CDAD (*Infect Control Hosp Epidemiol* 2001;22:42-45).

*Clostridium difficile* remains the most common cause of infectious diarrhea in hospitalized patients and is responsible for considerable morbidity, increased hospital costs, and, in some instances, mortality.<sup>1,2</sup> Although our hospital-wide yearly incidence of *C. difficile*-associated diarrhea (CDAD) cases has remained relatively stable, we found a marked variability in the number of new cases from 1 month to another and from one nursing unit to another. This case-control study was done to understand better the epidemiology of CDAD within our hospital.

## METHODS

The Veterans Affairs (VA) Medical Center in East Orange, New Jersey, is a university-affiliated, 400-bed, acute- and tertiary-care facility. This study was approved by the institutional review board. Cases were identified from microbiology laboratory records and included all inpatients with unformed stools and a positive *C. difficile* cytotoxin stool assay over a 24-month period (January 1994-December 1995). Each patient was considered only once, even though they may have had multiple stools positive for *C. difficile* cytotoxin. Controls were all patients with cytotoxin-negative unformed stools who were hospitalized on the same unit within 30 days of a case-patient. Stools for cytotoxin assays were frozen and sent on ice to a reference laboratory (VA Medical Center, West Haven, CT). The incidence density was calculated as the number of new cases per 1,000 patient-